Underdamped Linear problem with pure gradient flow
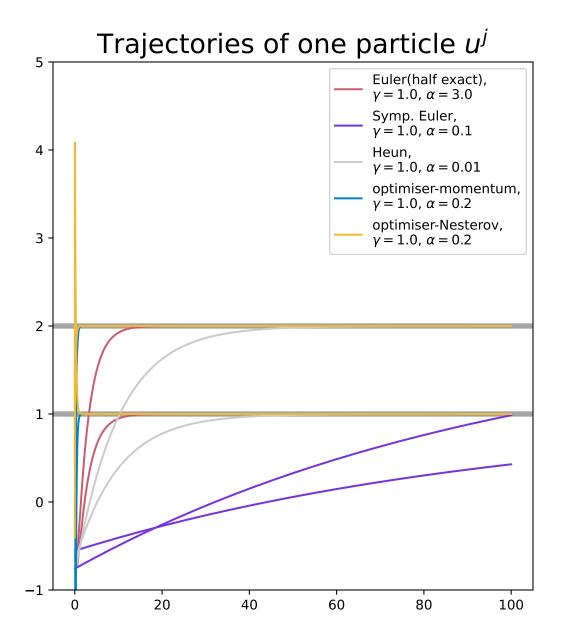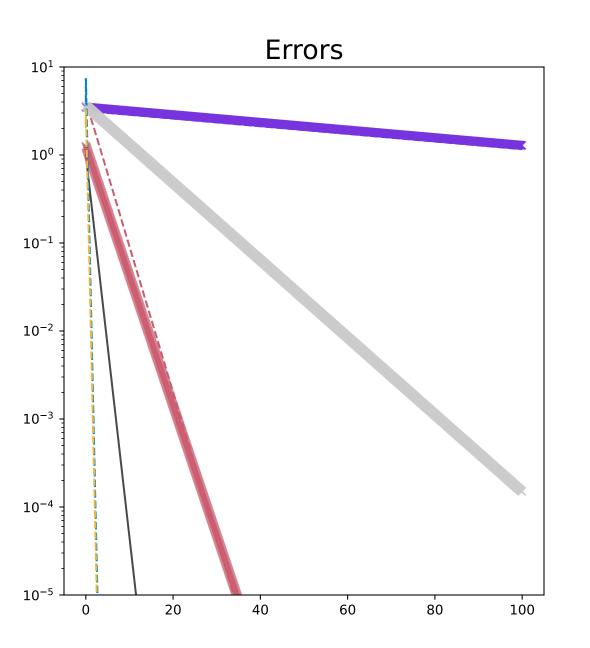
Trajectories of one particle u^j

Legend:
- Euler(half exact), $\gamma = 1.0, \alpha = 3.0$
- Symp. Euler, $\gamma = 1.0, \alpha = 0.1$
- Heun, $\gamma = 1.0, \alpha = 0.01$
- optimiser-momentum, $\gamma = 1.0, \alpha = 0.2$
- optimiser-Nesterov, $\gamma = 1.0, \alpha = 0.2$

Errors

Legend:
- $\exp -x$
- $\|Au^j - Au*\|_2$, Euler(half $\gamma = 1.0, \alpha = 3.0$
- rate: exp(-0.34)
- $\|Au^j - Au*\|_2$, Symp. Eul $\gamma = 1.0, \alpha = 0.1$
- rate: exp(-0.01)
- $\|Au^j - Au*\|_2$, Heun, $\gamma = 1.0, \alpha = 0.01$
- rate: exp(-0.1)
- $\|Au^j - Au*\|_2$, optimiser- $\gamma = 1.0, \alpha = 0.2$
- rate: exp(-0.06)
- $\|Au^j - Au*\|_2$, optimiser- $\gamma = 1.0, \alpha = 0.2$
- rate: exp(-0.06)